

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF SOUTH CAROLINA
COLUMBIA DIVISION

Chem-Nuclear Systems, LLC, Duratek)	Civil Action No. 03-03-441-CMC
Services, Inc. and Duratek, Inc.,)	
)	
Plaintiffs,)	
)	
vs.)	
)	
James Braun, Tracy Barker,)	
Kelly McCurry, Sharra Arnold, Carl)	
Rowland, Cam Abernethy, and)	
Mike Mohundro,)	
)	
Defendants.)	
_____)	
)	
Chem-Nuclear Systems, LLC, Duratek)	Civil Action No. 03-03-442-CMC
Services, Inc. and Duratek, Inc.,)	
)	
Plaintiffs,)	
)	
vs.)	
)	
)	
Avantech, Inc.,)	
)	
Defendant.)	
_____)	

AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER

This matter is before the court on the counterclaims for a declaratory judgment that U.S. Patent No. 6,387,274 (“the ‘274 patent”) is invalid for obviousness and is unenforceable for inequitable conduct.¹ A bench trial on these counterclaims was conducted October 25-27, 2005.

¹ The plural reference to “counterclaims” reflects the inclusion of a single counterclaim in each of the two actions captioned above. Both of these counterclaims seek relief on multiple grounds. Only the grounds of invalidity for obviousness and unenforceability for inequitable conduct survived to trial.

At the conclusion of the trial, the court recessed, then returned and placed its findings and conclusions on the record, finding in favor of the Defendants² on their counterclaims. The court directed Defendants to draft a proposed order containing those findings and conclusions and to circulate the draft to Plaintiffs for comment pursuant to Local Civil Rule 7.10.

The court's original rulings were entered on January 3, 2006. Thereafter, Plaintiffs filed a motion to alter or amend the January 3, 2006 order. The court hereby grants Plaintiffs' motion and issues these amended findings and conclusions.

I. BACKGROUND

A. The '274 Patent Generally

The '274 patent issued on May 14, 2002 based on an application filed in the United States Patent & Trademark Office (PTO) on March 28, 2000. The inventors named on the '274 patent are Scott H. Hendricks and Stephen Liebenow.

² In response to Plaintiffs' Motion to Alter or Amend the Court's Findings and Conclusions, the court hereby amends and clarifies its order with regard to the proper parties for the entry of judgment regarding the patent invalidity and unenforceability counterclaims. The court finds and concludes that the proper plaintiffs are Duratek Services, Inc. and Chem-Nuclear, LLC. Plaintiffs agree that Duratek, Inc. lacks standing to assert a claim for infringement of the '274 patent. Accordingly, Duratek, Inc. is not a proper party to a judgment of invalidity or unenforceability of the '274 patent, and this order does not serve as a basis for entry of a judgment against it on those claims.

The court further finds and concludes that the only Defendants with standing to assert these counterclaims are Defendants AVANTech, Inc., Barker, Braun and McCurry because these are the only parties that the claims for infringement of the '274 patent were asserted against and because the remaining Defendants were not in reasonable apprehension of such a claim. In response to the Plaintiffs' filing of a stipulation and covenant that the Plaintiffs would not pursue any claim against the other Defendants for past acts of infringement of the '274 patent, Defendants no longer oppose Plaintiffs' motion to the extent it seeks to limit assertion of the patent invalidity and unenforceability counterclaims to Defendants AVANTech, Braun, Barker, and McCurry. Accordingly, the court finds and concludes that judgment regarding these counterclaims shall only be entered in favor of Defendants AVANTech, Braun, Barker, and McCurry only.

As described in the specification, the '274 patent relates to a "system and method for the continuous removal of radioactive particulate, thus rendering the wastewater free of radioactive material." '274 patent, col. 1, lines 22-27. The system shown in the sole drawing figure of the '274 patent contains a series of elements beginning with a feed pump 2.³ Col. 2, lines 44-46. The feed pump 2 first supplies the liquid waste through "optional" carbon bed 3. Col. 2, line 61 through col. 3, line 3. A coagulant is added to the wastewater stream by chemical feed pump 6. Col. 3, lines 9-11. The pump 6 receives process signals from the particle charge (or "streaming current") detector 7. Col. 3, lines 16-20. The wastewater and coagulant are mixed in an inline static mixer 9. Col. 3, lines 28-30. After mixing, the admixture is then filtered by passing through filter 10 to remove coagulated particulate. Col. 3, lines 49-54. Upstream from the filter 10 is sample port 11 used to draw a sample of the liquid waste after contact with the added chemicals. Col. 3, lines 58-60. Downstream of the filter 10 is a series of vessels 14 that contain various media, such as ion exchange resin, to remove "ionic ions" that have passed through mechanical filtration. Col. 4, lines 10-14. The effluent from the series arrangement of vessels 14 is "optionally" passed through a second cartridge filter 15. Col. 4, lines 24-25.

B. The Claims of the '274 Patent

The '274 patent has a total of six claims, of which claims 1 and 4 are the independent claims. The claims of the '274 patent are set forth below.

1. A system for the continuous removal of radioactive particulates from a liquid waste stream comprising the following equipment arranged in the following order,

a feed pump for introducing a liquid waste stream containing radioactive particulate into a treatment zone containing filtering media at an upstream position;

³ The reference numbers used in this paragraph such as feed pump "2" are as used in the text and drawing figure of the '274 patent.

a chemical addition pump for continuously adding a coagulant to the liquid waste stream;

a static mixer;

a sample port located on the liquid waste stream [*sic*] upstream of any filters and connected to a charge detector for measuring the particle charge of the liquid waste stream;

at least one filter;

a series arrangement of continuous flow vessels each containing media; and

a controller unit responsive to the measured particle charge of the liquid waste stream and connected to the chemical addition pump.

2. The system of claim 1, wherein the treatment zone comprises a carbon bed.

3. The system of claim 1 wherein the media comprises ion exchange resin.

4. A method for the continuous removal of radioactive particulates from a liquid waste stream comprising,

a. continuously injecting a coagulant into a continuously flowing liquid waste stream comprising radioactive particulates;

b. mixing the coagulant and the liquid waste stream at ambient temperature using an inline static mixer in the flowing liquid waste stream without the use of a static mixing tank to form a flowing admixture stream;

c. passing the flowing admixture stream directly through a first filter to remove coagulated particulates;

d. continuously monitoring the admixture stream for the presence of charged particles and automatically controlling the continuous injection of coagulant into the liquid waste stream;

e. introducing the admixture stream after filtration into a series of vessels containing media;

f. passing the admixture after contact with the media through a second filter to form a substantially particulate-free stream; and

g. disposing of the particulate-free stream.

5. The method of claim 4 wherein the liquid waste stream comprising radioactive particulates is continuously passed through a bed of activated carbon to form a carbon treated stream prior to injection with the coagulant.

6. The method of claim 4 wherein the admixture is contacted with ion exchange resin in the series of vessels.

C. The Markman Order

After briefing by the parties, the court conducted a “Markman hearing” on July 20, 2004 for the purpose of determining the meaning of disputed claim terms. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), *aff’d*, 517 U.S. 370 (1996).

Based on the submissions of the parties and the testimony presented at the Markman hearing, the court determined the following:

- i. The phrase “[a] system for the continuous removal of radioactive particulates from a liquid waste stream” appearing in the preamble of claim 1 and the phrase “[a] method for the continuous removal of radioactive particulates from a liquid waste stream” appearing in the preamble of claim 4 mean that radioactive particles are removed continuously from the waste stream while the waste stream is flowing through the processing equipment. The language does not require that “essentially all” of the radioactive particulates be removed.
- ii. The phrase “comprising the following equipment arranged in the following order” appearing in the preamble of claim 1 means that the equipment specified must be arranged in the order specified.
- iii. The phrase “a feed pump for introducing a liquid waste stream containing a radioactive particulate into a treatment zone containing filtering media at an upstream position” in claim 1 means that the feed pump is located at an upstream position.
- iv. The phrase “a sample port located on the liquid waste stream upstream of any filters” appearing in claim 1 does not preclude the optional carbon bed No. 3 described in the specification of the ‘274 patent from being located upstream.
- v. The phrase “at least one filter” appearing in claim 1 means one or more filters, not limited to a specific porosity. The filters must be mechanical filters, i.e., there must be a mechanical function to these filters. Similarly, the “first filter” and “second filter” in claim 4 must also be mechanically functioning filters.

- vi. The phrase “a series arrangement of continuous flow vessels each containing media” appearing in claim 1 and “a series of vessels containing media” in claim 4 mean a series of vessels containing media arranged sequentially along a path with continuous flow. The term media includes, but is not limited to, media capable of removing ions.
- vii. The phrase “using an in-line static mixer in the flowing liquid waste stream without the use of a static mixing tank to form a flowing admixture stream” appearing in claim 4 means that the mixing is accomplished using a static mixer in-line with a continuously flowing waste stream and without using a mixing tank to process the waste stream in batches, i.e., it is not a batch system.
- viii. The word “directly,” appearing in claim 4 as part of the phrase “passing the flowing admixture stream directly through a first filter to remove coagulated particulates,” means without intervening processing or treatment. There can be an intervening structure or intervening piece of equipment, but not an intervening process or treatment.
- ix. The phrase “disposing of the particulate-free stream” in claim 4 means discharged or recycled.

In addition, the court determined that upstream carbon bed 3 described in the specification of the ‘274 patent is not a “filter” as that term is used in claims 1 and 4. The court also determined that the upstream carbon bed is not required to be included in claims 1 and 4, but is an optional piece of equipment. The upstream carbon bed is, however, a required piece of equipment in claims 2 and 5 of the ‘274 patent.⁴

II. OBVIOUSNESS

A patent is invalid if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject patent

⁴ The wording of dependent claim 5 expressly indicates that the liquid waste stream “is continuously passed through a bed of activated carbon” prior to injection of the coagulant. At the summary judgment hearing conducted June 8, 2005, the court clarified its interpretation that claim 2 also requires an upstream carbon bed. Hearing Tr. 78:9-16.

pertains.” 35 U.S.C. § 103(a); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 716 (Fed. Cir. 1991). ““While the ultimate question of patent validity is one of law,’ the conclusion that an invention would have been obvious is dependent upon several basic factual inquiries.” *Ryko*, 950 F.2d at 716 (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966)). “These inquiries include the scope and content of the prior art, the level of ordinary skill in the field of the invention, the differences between the claimed invention and the prior art, and any objective evidence of non-obviousness such as long-felt need, and commercial success.” *Sibia Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1355 (Fed. Cir. 2000) (citing *Graham*, 383 U.S. at 17-18).

The determination of obviousness is objective, and is judged from the viewpoint of a hypothetical person of ordinary skill in the art who does not know of the invention but does know of all analogous prior art. *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1572-76 (Fed. Cir. 1984). Hindsight is to be avoided in making the obviousness determination. *Id.* at 1576. Instead, the determination of obviousness is based on a perception of the prior art at the moment just before the invention was made. *See id.* Moreover, there must be some suggestion or motivation to modify or combine prior art in order to arrive at the claimed invention. *Sibia Neurosciences*, 225 F.3d at 1356. “This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved.” *Id.* (internal citations omitted); *see also Pro-Mold and Tool Co., Inc. v. Great Lake Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

Patents are presumed valid. 35 U.S.C. § 282. Moreover, each claim of a patent is presumed valid independently of the validity of other claims. *Id.* This presumption is a procedural device that allocates the burden of proof; it is “not substantive law.” *DMI, Inc. v.*

Deere & Co., 802 F.2d 421, 427 (Fed. Cir. 1986). The party challenging the validity of a patent bears the burden of proving the underlying factual inquiries by clear and convincing evidence. *Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc.*, 750 F.2d 1552, 1560 (Fed. Cir. 1984). “While the presentation at trial of a reference that was not before the examiner does not change the presumption of validity, the alleged infringer’s burden may be more easily carried because of this additional reference.” *Sibia Neurosciences*, 225 F.3d at 1355-56.

At the trial, Defendants asserted that claims 1, 3, 4 and 6 of the ‘274 patent were invalid for obviousness under 35 U.S.C. § 103(a). In view of the court’s determination that claims 2 and 5 require an upstream carbon bed, Defendants did not allege obviousness of those claims. Thus, as to claims 1, 3, 4 and 6, the court will now address each of the *Graham* factors.

A. Scope and Content of Prior Art

The first *Graham* factor requires that the court determine what information presented by the parties at trial constitutes relevant prior art under the patent statute. Under 35 U.S.C. § 102(b), prior art includes information which is “patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.” In this case, March 28, 1999 is “the critical date” for purposes of 35 U.S.C. § 102(b) because it is the date one-year before the filing date of the ‘274 patent. *See Auld Co. v. Chroma Graphics Corp.*, 714 F.2d 1144, 1147 (Fed. Cir. 1983).

Evidence was presented at trial regarding previous systems deployed by Plaintiffs to treat radioactive wastewater at nuclear plants. These included:

(1) “Seabrook Rev. 6” (Defendants’ Exhibit 364) - This is a drawing of the “Advanced Liquid Processing System” (ALPS) installed by Plaintiff Chem-Nuclear Systems,

LLC (“Chem-Nuclear”) at the Seabrook nuclear power plant. The drawing shows a pair of chemical addition pumps that inject coagulant chemical into a waste stream at a position immediately upstream of a feed pump. After the feed pump, the drawing indicates that the waste water would then flow through a bag filter (labeled “optional”), followed by a series of “Equa-Flex vessels” containing media, followed by a pair of cartridge filters (also labeled “optional”), and then returned to the plant. The drawing also shows an “optional” in-line static mixer disconnected from the equipment, but which can be inserted at various locations as desired.

(2) IP-2 FTDS-10 (Defendants’ Exhibit 311) - This is a drawing of the ALPS system installed by Chem-Nuclear at the Indian Point 2 nuclear power plant. This system included a chemical addition pump injecting a coagulant chemical into a liquid waste stream at a position immediately upstream of a feed pump. After the feed pump, the water would flow through a bag filter, followed by a series of “pressure vessels” containing media, followed by a cartridge filter. After flowing through the cartridge filter, the water was returned to the plant.

(3) C*LEAR Modules - Evidence was also presented at trial regarding ALPS systems installed by Chem-Nuclear at the DC Cook nuclear power plant and the Indian Point 3 nuclear power plant which included a device known as the “C*LEAR Module.” As shown, for example, in Defendants’ Exhibits 97 and 337, these systems each included a feed pump followed by the C*LEAR Module. After the C*LEAR Module, the water was fed to a series of “Equa-Flex” vessels containing media. The testimony at trial from Plaintiffs’ witness Earl Reagan and Defendant Barker indicated that the first vessel in the series would typically be an activated carbon bed. The subsequent vessels included cation, anion or mixed resin beds. The water was then returned to the plant.

The C*LEAR Module itself includes a pair of chemical addition pumps. One of these chemical addition pumps is electrically connected to an in-line streaming current detector (“SCD”)⁵ intended to control the amount of coagulant chemical injected into the waste stream. An in-line static mixer (designated “MX-20” in the drawings) is located immediately downstream of the injection point for this pump, followed by a pair of mixing columns. The sample port from which a sample of the waste water is drawn for the SCD is located between mixing columns.

A number of articles about the use of SCDs were also admitted into evidence at trial. These were:

(1) Christopher A. Walker, James T. Kirby & Steven K. Dentel, “The Streaming Current Detector: A Quantitative Model,” Journal of Colloid and Interface Science, Vol. 182, pages 71-81 (1996) (Defendants’ Exhibit 200).

(2) A publication dated May 1992 by Timothy D. Peterson, entitled “Better Control Means Better Performance: Streaming Current Monitor Controls Coagulant Addition” (Defendants’ Exhibit 315).

(3) Robert L. Bryant, “Streaming Current Monitor Optimizes Coagulation,” Opflow, Vol. 12, No. 2 (February 1986) (Defendants’ Exhibit 316).

(4) Robert L. Bryant, “Instruments: Optimizing Pretreatment - A Key to Downstream Equipment Performance,” Ultrapure Water, pages 34-37 (March 1997) (Defendants’ Exhibit 317).

⁵ Although the words “in-line” may precede the abbreviation “SCD” at some points in this order, the term SCD itself, as used in this order, refers exclusively to in-line streaming current detectors.

Each of these articles describes in some manner the known use of an in-line SCD in controlling coagulant addition.

The evidence is undisputed that each of the four articles noted above was published prior to the critical date. Accordingly, the court finds by clear and convincing evidence that these articles constitute prior art. *See* 35 U.S.C. § 102(b) (publications prior to the critical date are prior art).

The court also finds by clear and convincing evidence that the Indian Point 2 ALPS system is prior art. In this regard, the undisputed evidence shows that this system was used in the customer's facility by Plaintiff Chem-Nuclear in the performance of a commercial contract prior to the critical date. Such commercial exploitation makes the use a "public use" under 35 U.S.C. § 102(b), even if performed under conditions of secrecy. *See Invitrogen Corp. v. Biocrest Mfg, L.P.*, 424 F.3d 1374, at *16-18 (Fed. Cir. October 5, 2005); *New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co.*, 298 F.3d 1290, 1299 (Fed. Cir. 2002).

Regarding the ALPS system shown in the Seabrook Rev. 6 drawing, the court finds that the testimony about what was done at Seabrook does not meet the clear and convincing standard. Specifically, the court finds that the testimony is not clear and convincing as to when the different versions were actually put into use at Seabrook. Accordingly, the court does not find the Seabrook Rev. 6 system to be prior art.

For the same reasons as the Indian Point 2 system, the court finds, by clear and convincing evidence, that the ALPS systems at DC Cook and Indian Point 3 employing a C*LEAR Module with an in-line SCD have been shown to be prior art. The court does not, however, find clear and convincing evidence that the SCD aspect of the C*lear Module was successful. The court, nonetheless, finds that the lack of complete success does not negate the

prior art status of the C*LEAR Module for all that it teaches. *See Beckman Instruments, Inc. v. LKB Producter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989) (“Even if a reference discloses an inoperative device, it is prior art for all that it teaches.”).

None of the prior art listed above was disclosed to or specifically considered by the patent examiner in determining whether to grant the ‘274 patent.

“Determining whether there is a suggestion or motivation to modify a prior art reference is one aspect of determining the scope and content of the prior art. . . .” *Sibia Neurosciences*, 225 F.3d at 1356. In this regard, the court finds there was evidence both ways. Specifically, there was testimony about some failures in the C*LEAR Module which provides some evidence of a teaching away. The court concludes, however, that the evidence is clear and convincing that the use of an in-line SCD as a concept was not discouraged by the C*LEAR Module experience. Rather, only the particular way that the in-line SCD was used in the C*LEAR Module was discouraged (*i.e.*, use of the SCD with a sample port located between mixing columns located directly upstream and downstream, respectively).

In reaching this conclusion, the court relies on the fact that Defendant Tracy Barker (who was an employee of Plaintiff Chem-Nuclear at the time) prepared a memorandum dated December 15, 1998 regarding the prospective use of an SCD in the Korean ALPS system.⁶ (Defendants’ Exhibit 77) This memorandum was addressed to Mr. Hendricks and others within the company. In addition, Mr. Barker sent an email dated February 23, 1999 to Ahmad Ghandour, another Chem-Nuclear employee, indicating that the Korean ALPS “must have an

⁶ The evidence indicated that Chem-Nuclear was awarded a contract in September 1998 for the sale of this ALPS system to Korea Electric. (Defendants’ Exhibit 309.)

SCD.” (Defendants’ Exhibit 353) This suggests that he was not discouraged by the C*LEAR Module from adding an SCD to ALPS. In addition, there is no evidence that anyone at the company challenged Mr. Barker’s suggestion based on the C*LEAR Module experience.

Moreover, the SCD does automatically what was being done manually in the ALPS system. *See In re Venner*, 262 F.2d 91, 95 (C.C.P.A. 1958) (“Furthermore, it is well settled that it is not ‘invention’ to broadly provide a mechanical or automatic means to replace manual activity which accomplished the same result.”). SCD’s were being used in a similar way in many other industries. No evidence was presented of any literature or other art suggesting that an in-line SCD could not be used in the nuclear wastewater treatment industry in the same way it had been used to treat other wastewater.

B. Differences Between Prior Art and Claims at Issue

The next *Graham* factor requires that the court examine differences between the prior art and the claims at issue. Prior ALPS systems such as the one utilized at Indian Point 2 did not utilize in-line SCDs. While the ALPS systems at DC Cook and Indian Point 3 employing C*LEAR Modules did utilize in-line SCDs, it appears that use was not successful. The prior ALPS did involve manual testing using Mutek or other particle charge detectors. These were not in-line but lab models. The sample port placement varied for ALPS and the C*lear Module, which had various differences particularly regarding the extremely long mixing columns and mid mixing sampling. Finally, while the prior art articles considered by the court did discuss the use of in-line SCDs for coagulant control, that usage did not concern the treatment of radioactive liquid waste.

C. Level of Skill in the Art

Based on the expert testimony at the trial, the court finds that the level of ordinary skill in the art is a bachelor of science degree in engineering with a nuclear, chemical or environmental

specialty and five years of relevant experience.

D. Secondary Considerations

In determining whether the secondary considerations merit attention, the court finds by clear and convincing evidence that the system marketed by Plaintiffs as the Advanced Injection Method (AIM) has enjoyed commercial success in the field and solved a long felt need. The AIM system is a commercial embodiment of the system claimed in the '274 patent. This evidence of secondary considerations is somewhat limited, however, because of lack of proof of nexus between the secondary considerations and the subject matter specifically claimed in the '274 patent. *See Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539 (Fed. Cir. 1983). In this regard, the evidence of success here related primarily to the AIM cabinet being outside the radiation area and the success regarding the removal of Cobalt 58. Neither of these are referenced in the '274 patent. The court, nonetheless, finds that, overall, this factor favors Plaintiffs.

E. Legal Determination of Obviousness

The court now turns to the legal determination to be made based on the factual findings. That is, are the differences between the patented subject matter and the prior art such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which that subject matter relates? In this regard, the court concludes that the subject matter as a whole -- ALPS plus SCD with placement in the particular order used -- would have been obvious in March 1999 to one skilled in the art with knowledge of the SCD literature, Chem-Nuclear's C*LEAR Module, and the previous ALPS

systems considered by the court.⁷ The secondary considerations discussed above do not have sufficient weight to overcome the court's obviousness determination. *See Ryko*, 950 F.2d at 719.

III. INEQUITABLE CONDUCT

A patent applicant has a duty of candor and good faith when dealing with the PTO. 37 C.F.R. 1.56; *Bruno Indep. Living Aids, Inc. v. Acorn Mobility Services, Ltd.*, 394 F.3d 1348, 1351 (Fed. Cir. 2005). An applicant's breach of this duty constitutes "inequitable conduct." *Union Oil Co. v. Atl. Richfield Co.*, 208 F.3d 989, 1001 (Fed. Cir. 2000). "Inequitable conduct includes affirmative misrepresentations of a material fact, failure to disclose material information, or submission of false material information, coupled with an intent to deceive." *Baxter Int'l Inc. v. McGaw Inc.*, 149 F.3d 1321, 1327 (Fed. Cir. 1998). Inequitable conduct renders the patent unenforceable. *LaBounty Mfg., Inc. v. U.S. Int'l Trade Comm'n*, 958 F.2d 1066, 1070 (Fed. Cir. 1992).

Both materiality and intent are questions of fact on which the party alleging inequitable conduct bears the burden of proof by clear and convincing evidence. *Purdue Pharma L.P. v. Endo Pharmaceuticals, Inc.*, 410 F.3d 690, 695 (Fed. Cir. 2005). Materiality and intent are then weighed to determine whether the equities warrant a conclusion that inequitable conduct occurred. *Id.* at 696; *Bruno*, 394 F.3d at 1351.

A. Materiality

The current version of 37 C.F.R. § 1.56 (which was also in effect during the time that the '274 was being prosecuted in the PTO) defines materiality as follows:

⁷ The court reaches this result with or without consideration of the Seabrook Rev 6 drawing and without consideration of any experimentation-type work being done by Hendricks around the time of the 1999 Seabrook Outage. An "outage" is a period when the nuclear reactor is shut down for refueling and maintenance.

[I]nformation is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

Notably, a reference can be material even if an examiner eventually deems the claims patentable in light of that reference. *Molins, PLC v. Textron, Inc.*, 48 F.3d 1172, 1179 (Fed. Cir. 1995). Moreover, the misrepresentation need not be relied upon by the examiner in allowing a patent, but need only be within the examiner's realm of consideration. *Merck & Co. v. Danbury Pharmaceutical, Inc.*, 873 F.2d 1418, 1421 (Fed. Cir. 1989); *see also Perdue Pharma*, 410 F.3d at 698-99 ("Even if the examiner did not necessarily rely on Purdue's discovery of a four-fold dosage range, however, that would not be inconsistent with a finding of materiality.").

In order to be guilty of inequitable conduct, an applicant must be chargeable with knowledge of the prior art or information. *Molins*, 48 F.3d at 1178. However, "an applicant who knew of the art or information cannot intentionally avoid learning of its materiality ... it may be found that the applicant 'should have known' of that materiality." *Bruno*, 394 F.3d at 1352 (citations omitted). "It is axiomatic that 'close cases should be resolved by disclosure, not unilaterally by applicant.'" *GFI, Inc. v. Franklin Corp.*, 265 F.3d 1268, 1274 (Fed. Cir. 2001) (quoting *LaBounty*, 958 F.2d at 1076).

Applying these principles, the court finds by clear and convincing evidence that the applicants for the '274 patent submitted both false and misleading material information to the

PTO. The court also finds that the applicants failed to disclose to the PTO other material information, especially regarding the C*LEAR Module.

The false and misleading information was primarily the following statement in the patent itself:

Maintaining and measuring the charge particles in liquid streams is accomplished using an instrument called a particle charge detector, also known as a streaming charge detector [*sic*]. Such instruments are well known and have been used in the waste industry, but only for treating non-radioactive municipal and industrial wastewater effluents. We have surprisingly found that the use of such a particle charge detector with liquid wastes containing radioactive materials will provide large advantages over conventional treatment processes used to treat radioactive liquid wastes.

'274 patent, col. 2, lines 14-22. This clearly indicates that in-line SCDs had only been used to treat non-radioactive wastewater in the past when, in fact, that was not a true statement.

There was also a misleading statement during the prosecution of the patent application in which applicants distinguished U.S. Patent No. 5,202,016 to Church (which described an SCD).

In particular, applicants stated:

Church et al., on the other hand, is directed solely to the treatment of sludge or sewage having a high solids content and large particle size. (Col. 4, lines 38-41). There is absolutely no mention of the removal of radioactive particles.

(Plaintiffs' Exhibit 60, page CPTO-212). Thus, in attempting to overcome the examiner's application of the Church patent, applicants argued that it did not relate to the treatment of radioactive wastewater. Applicants did not tell the examiner, however, about the C*LEAR Module. The C*LEAR Module included an in-line SCD and had been used for a number of years at Chem-Nuclear for that very purpose.

Regarding applicants' knowledge, the court finds the evidence to be clear and convincing not only that information that was submitted was false and material information was not

disclosed, but that Scott Hendricks knew about this information. Mr. Barker testified that he traveled to the Seabrook nuclear power plant in New Hampshire in December 1998 for the purpose of escorting several Korean visitors around the plant.⁸ Mr. Hendricks admitted that he was at Seabrook during that time and that Mr. Barker was there with the Korean visitors. Mr. Hendricks stated, however, that he did not remember talking with Mr. Barker about an SCD. In contrast, Mr. Barker testified that they did discuss the use of SCDs.

The court finds Mr. Barker's testimony more credible primarily because it was corroborated by his December 15, 1998 memorandum (Defendants' Exhibit 77), which Plaintiffs produced in discovery. The memorandum, which indicates that the visit was "last week," specifically states that there had been a discussion of SCDs during the visit. The memorandum also lists the locations where the C*LEAR Modules were used and includes various attachments relating to in-line SCDs.

In addition, there was an email dated August 25, 1999 from Greg Austin, another Chem-Nuclear employee, on which Mr. Hendricks was copied as a recipient. (Defendants' Exhibit 15) This email contains a discussion indicating that the C*LEAR Module was considered to be a good concept at that point in time.

Mr. Hendricks himself gave a Power Point presentation in July 2000 in which he discussed the C*LEAR Module. (Defendants' Exhibit 75.) Mr. Hendricks testified that someone else prepared the materials and he did not remember much about the C*LEAR Module. It is apparent to the court, however, that both prior to and during the process of applying for the '274 patent, Mr. Hendricks knew about the C*LEAR Module and also knew that the C*LEAR Module had utilized an in-line SCD.

⁸ This was in connection with the recent sale of an ALPS system to Korea Electric, discussed above, that was, according to Barker's memoranda, to include an SCD.

The court determines that Mr. Hendricks' testimony that he did not know much about the C*LEAR Module lacks credibility for a number of reasons. For example, Mr. Hendricks testified that he went to the Turkey Point nuclear plant in the winter of 2000 to remove the C*LEAR Module located there.⁹ At trial, Mr. Hendricks testified that he basically just saw the cabinet at that time, but did not look into it or really know anything about it. He was then cross-examined with his deposition in which he had testified that he noticed at that time that the C*LEAR Module had a Milton-Roy SCD.

Under cross-examination, Mr. Hendricks tried to explain that he had not learned about the SCD until later and had misspoken in his deposition. That testimony alone would have been unclear. Within the next few minutes, however, Mr. Hendricks was asked why he failed to tell the PTO about the prior use of SCDs. He responded that *he did not tell the PTO of them because they were unsuccessful*. He had, however, just denied knowing that there had been any SCDs in use. The court concludes from this sequence of events that, rather than being confused, Mr. Hendricks attempted to give false testimony and was caught in that attempt.

For the foregoing reasons, the court concludes that Mr. Hendricks' testimony alleging lack of knowledge of the C*LEAR module and its prior use of an SCD in treating radioactive wastewater is not credible. In addition, the court finds there is strong evidence, corroborated by documents, that Mr. Hendricks did know this information. Accordingly, the court specifically finds, by clear and convincing evidence, that Mr. Hendricks was aware of the C*LEAR module and that it used an in-line SCD both before and during the time the '274 patent application was pending. The court further finds that Mr. Hendricks knowingly submitted false material information and failed to disclose material information to the PTO.

⁹ Mr. Hendricks further testified that by "winter" he was referring to the January-February-March timeframe.

Regarding materiality, the court finds that the false and undisclosed information was not cumulative to information considered by the patent examiner during prosecution of the patent application. The false and undisclosed information was different from, more relevant to, and more significant to the issues before the examiner than anything else the examiner considered. There was undisputed testimony from Dr. Ralph White, Defendants' designated technical expert, that none of the references considered by the examiner showed the use of an in-line SCD in the treatment of radioactive liquid waste. Nondisclosed information "could not possibly be cumulative with respect to a feature not found in any disclosed prior art." *LaBounty*, 958 F.2d at 1076.

Pursuant to 37 CFR § 1.56(b)(2), noncumulative information is material if it refutes or is inconsistent with a position that the patent applicant took in either (i) opposing an argument of unpatentability relied on by the PTO or (ii) by asserting an argument of patentability. In this regard, the court finds that the false and nondisclosed information was inconsistent with a position that the applicants took in opposing an argument of unpatentability relied on by the PTO and in asserting an argument of patentability. Specifically, as discussed above, applicants distinguished the Church patent cited by the examiner on the basis that it did not disclose the treatment of radioactive wastewater. This was consistent with the statement in the patent itself that SCDs had not previously been used in the treatment of radioactive liquid waste.

Accordingly, the court finds by clear and convincing evidence the submission of false or misleading information and the failure to disclose information by the applicants. The court further finds , by clear and convincing evidence, that the information was material.

B. Intent

“Intent need not, and rarely can, be proven by direct evidence.” *Bruno*, 394 F.3d at 1354 (quoting *Merck*, 873 F.2d at 1422); *GFI*, 265 F.3d at 1274 (“the facts in inequitable conduct cases rarely include direct evidence of admitted deceitful conduct”). Intent to deceive is generally inferred from the facts and circumstances. *Molins*, 48 F.3d at 1180-81. Importantly, deceptive intent may be inferred when an applicant fails to disclose material information that would have precluded assertions he made to the PTO. *Bruno*, 394 F.3d at 1353-54 (novelty argument would not have been available had applicant disclosed the material information in its possession); *LaBounty*, 958 F.2d at 1076 (“the evidence amply supports an inference that LaBounty acted with culpable intent to mislead or deceive the PTO by withholding its own known prior art devices and by making an argument for patentability which could not have been made had the art been disclosed.”); *Fox Indus. v. Structural Pres. Sys.*, 922 F.2d 801, 804 (Fed. Cir. 1990) (finding inequitable conduct based on applicant’s failure to disclose its own advertising brochure); *GFI*, 265 F.3d at 1275 (argument of novelty would have been precluded by applicant’s prior knowledge). Additionally, failure to proffer a credible explanation for nondisclosure of material information may create an inference of an intent to deceive. *Bruno*, 394 F.3d at 1354 (“Normally, it can be expected that an innocent party will be motivated to try to present convincing reasons for its actions or inaction”).

In this case, the court finds a significant amount of circumstantial evidence that supports the conclusion that there was an intent to mislead. Mr. Hendricks changed his testimony and testified falsely on two occasions during the trial. Further, the circumstances do not indicate good faith on the part of the applicants. Mr. Hendricks did deny knowledge and an intent to mislead. However, the fact that he was untruthful concerning the issues when he realized the

significance of that testimony casts doubt on the credibility of his statements about his knowledge and intent at the relevant time.

Because the materiality is very high, the level of intent does not need to be as high. *Purdue Pharma*, 410 F.3d at 700. The court, however, finds clear and convincing evidence of intent to mislead for the reasons described above.

C. Weighing Materiality and Intent

Weighing the factors of materiality and intent in light of all the circumstances, the court concludes that applicants committed inequitable conduct during prosecution of the '274 patent.

III. CONCLUSION

For the foregoing reasons, the court concludes that Defendants AVANTech, Braun, Barker and McCurry are entitled to judgment on their counterclaims for declaratory judgment of patent invalidity and unenforceability.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED:

1. That claims 1, 3, 4 and 6 of U.S. Patent No. 6,387,274 are invalid under 35 U.S.C. § 103(a).
2. That U.S. Patent No. 6,387,274 is unenforceable due to inequitable conduct.
3. That judgment shall be entered in favor of Defendants AVANTech, Braun, Barker and McCurry on their counterclaims for declaratory judgment of patent invalidity and unenforceability against Plaintiffs Duratek Services, Inc., and Chem-Nuclear Systems, LLC.

IT IS SO ORDERED.

Columbia, South Carolina
February 23, 2006

S/ Cameron McGowan Currie
CAMERON MCGOWAN CURRIE
UNITED STATES DISTRICT JUDGE

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